



0400

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No.: **UT-0037**

COPY OF PAPERS
ORIGINALLY FILED

Inventors: **Rao et al.**

Serial No.: **10/025,333**

Filing Date: **December 19, 2001**

Examiner: **Not Yet Assigned**

Group Art Unit: **Not Yet Assigned**

Title: **Generation, Characterization and
Isolation of Neuroepithelial Stem Cells
and Lineage Restricted Intermediate
Precursor**

I, **Kathleen A. Tyrrell**, Registration No. 38,350, certify that this correspondence is being deposited with the U.S. Postal Service as First Class mail in an envelope addressed to the Assistant Commissioner for Patents and Trademarks, Washington, D.C. 20231.

On this date: **February 6, 2002**



Kathleen A. Tyrrell, Registration No. 38,350

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. §1.56 and in accordance with 37 C.F.R. §§1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 C.F.R. §1.56(b).

(XX) In accordance with §1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified

application, within three months of the date of entry into the national stage of the above identified application as set forth in §1.491, or before the mailing date of a first Office Action on the merits of the above-identified application, no additional fee is required.

- () In accordance with §1.97(c), this Information Disclosure Statement is being filed after the period set forth in §1.97(b) above but before the mailing date of either a Final Action under §1.113 or a Notice of Allowance under §1.311, therefore:
 - () Certification in Accordance with §1.97(e) is set forth below; or
 - () The fee of \$180.00 as set forth in §1.17(p) is attached.
- () In accordance with §1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under §1.113 or a Notice of Allowance under §1.311 but before the payment of the Issue Fee, therefore included are: Certification in Accordance with §1.97(e); Petition Requesting Consideration of the Information Disclosure Statement; and the fee of \$130.00 as set forth in §1.17(i)(1).
- () Copies of each of the references listed on the attached Form PTO-1449 (modified) are enclosed herewith.
- (XX)** In accordance with §1.98(d), copies of some or all of the references listed on the attached Form PTO-1449 (modified)

are not enclosed herewith because they were previously submitted to the U.S. Patent and Trademark Office in prior application Serial No. 08/852,744, filed May 7, 1997, for which a claim for priority under 35 U.S.C. §120 has been made in the instant application.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-1619. This form is submitted in duplicate.

The relevance of the listed references in a foreign language is as stated in the specification at pages @@.

(XX) All listed references are in the English language.

Respectfully submitted,


Kathleen A. Tyrrell
Registration No. 38,350

Date: February 6, 2002

Licata & Tyrrell P.C.
66 E. Main Street
Marlton, New Jersey 08053

(856) 810-1515



COPY OF PAPERS
ORIGINALLY FILED

Sheet 01 of 03

| | | | |
|--------------------------------------|---|----------------------------------|-------------------------------|
| PTO-1449 | U. S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE | ATTY. DOCKET NO. UT-0037 | SERIAL NO. 5 10/025,333 |
| LIST OF PRIOR ART CITED BY APPLICANT | | APPLICANT Rao, et al | |
| | | FILING DATE December 19, 2001 | GROUP Not Yet Assigned |

U. S. PATENT DOCUMENTS

| EXAMINER INITIALS | DOCUMENT NUMBER | DATE | NAME | CLASS | SUBCLASS | FILING DATE IF APPROPRIATE |
|-------------------|-----------------|---------------|-----------------|-------|----------|----------------------------|
| AA | 5,589,376 | Dec. 31. 1996 | Anderson, et al | | | |
| | | | | | | |
| | | | | | | |

FOREIGN PATENT DOCUMENTS

| | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUBCLASS | TRANSLATION |
|--|-----------------|------|---------|-------|----------|-------------|
| | | | | | | YES NO |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

OTHER PRIOR ART (Including Author, Title, Pertinent Pages, Etc.)

| | | |
|----|--|--|
| AG | | Gage, F.H., et al. <i>Isolation, Characterization and Use of Stem Cells from the CNS</i> . 18 Ann. Rev. Neurosci. 159-92 (1995) |
| AH | | Marvin, M., et al. <i>Multipotential Stem Cells in the Vertebrate CNS</i> . 3 Semin. Cell. Biol. 401-11 (1992) |
| AI | | Davis, A.A., et al. <i>A Self-Renewing Multipotential Stem Cell in Embryonic Rat Cerebral Cortex</i> . 362 Nature 363-72 (1994) |
| AJ | | Gritti, A.G., et al. <i>Multipotential Stem Cells from the Adult Mouse Brain Proliferate and Self-Renew in Response to Basic Fibroblast Growth Factor</i> . 16 J. Neurosci. 1091-1100 (1996) |
| AK | | Reynolds, B.A., et al. <i>A Multipotent EGF-Responsive Striatal Embryonic Progenitor Cell Produces Neurons and Astrocytes</i> , 12 J. Neurosci. 4565-74 (1992) |
| AL | | Reynolds, B.A., et al. <i>Clonal and Population Analyses Demonstrate that an EGF-Responsive Mammalian Embryonic CNS Precursor is a Stem Cell</i> . 173 Developmental Biol. 1-13 (1996) |
| AM | | Williams, B.P., et al. <i>The Generation of Neurons and Oligodendrocytes from a Common Precursor Cell</i> . 7 Neuron 685-93 (1991) |
| AN | | Kilpatrick, T.J., et al. <i>Cloned Multipotential Precursors from the Mouse Cerebrum Require FGF-2, Whereas Glial Restricted Precursors are Stimulated with Either EGF-2 or EGF</i> . 15 J. Neurosci. 3653-61 (1995) |
| AO | | Price, J., et al. <i>Lineage Analysis in the Vertebrate Nervous System by Retrovirus-Mediated Gene Transfer</i> . 84 Developmental Biol. 156-60 (1987) |
| AP | | Williams, B., <i>Precursor Cell Types in the Germinal Zone of the Cerebral Cortex</i> . 17 BioEssays 391-93 (1995) |
| AQ | | Hamburger, V., <i>The Mitotic Patterns in the Spinal Cord of the Chick Embryo and Their Relation to the Histogenetic Process</i> . 38 J. Comp. Neurol. 221-84 (1948) |
| AR | | Nornes, H.O., et al. <i>Temporal Pattern of Neurogenesis in the Spinal Cord of Rat. I. An Autoradiographic Study - Time and Sites of Origin and Migration and Settling Patterns of Neuroblasts</i> . 72 Brain Res. 121-38 (1974) |
| AS | | Altman, J., et al. <i>The Development of the Rat Spinal Cord</i> . 85 Adv. Anat. Embryol. Cell Biol. 32-46 (1984) |
| AT | | Phelps, P.E., et al. <i>Generation Patterns of Four Groups of Cholinergic Neurons in Rat Cervical Spinal Cord: A Combined Tritiated Thymidine Autoradiographic and Choline Acetyltransferase Immunocytochemical Study</i> . 273 J. Comp. Neurol. 455-72 (1988) |

O I P E JCBB
FEB 21 2002

Sheet 02 of 03

| | | |
|--|----|---|
| | AU | Phen, P.E., et al, <i>Embryonic Development of Four Different Subsets of Cholinergic Neurons in Rat Cervical Spinal Cord</i> , 1 Comp. Neurol. 9-26 (1990) |
| | AV | Chen, E.W., et al, <i>Early Stages in the Development of Spinal Motor Neurons</i> , 320 J. Comp. Neurol. 291-303 (1992) |
| | AW | Dodd, J., et al, <i>Spatial Regulation of Axonal Glycoprotein Expression on Subsets of Embryonic Spinal Neurons</i> , 1 Neuron 105-16 (1988) |
| | AX | Erickson, J., et al, <i>Early Stages of Motor Neuron Differentiation Revealed by Expression of Homeobox Gene Islet-1</i> , 256 Science 1555-59 (1992) |
| | AY | Hirano, M., et al, <i>Gliogenesis in the Rat Spinal Cord: Evidence for Origin of Astrocytes and Oligodendrocytes from Radial Precursors</i> , 21 J. Neurosci. Res. 155-67 (1988) |
| | AZ | Warf, B.C., et al, <i>Evidence for the Ventral Origin of Oligodendrocyte Precursors in the Rat Spinal Cord</i> , 11 J. Neurosci. 2477-88 (1991) |
| | BA | Pringle, N.P., et al, <i>A Singularity of PDGF Alpha-Receptor Expression in the Dorsoventral Axis of the Neural Tube May Define the Origin of the Oligodendrocyte Lineage</i> , 117 Development 525-33 (1993) |
| | BB | Anderson, D.J., <i>The Neural Crest Cell Lineage Problem: Neurogenesis? 3 Neuron 1-12 (1989)</i> |
| | BC | Ray, J., et al, <i>Spinal Cord Neuroblasts Proliferate in Response to Basic Fibroblast Growth Factor</i> , 14 J. Neurosci. 3548-64 (1994) |
| | BD | Bronner-Fraser, M., et al, <i>Cell Lineage Analysis Shows Multipotency of Some Avian Neural Crest Cells</i> , 355 Nature 161-64 (1988) |
| | BE | Murphy, M., et al, <i>Fibroblast Growth Factor Stimulates the Proliferation and Differentiation of Neural Precursor Cell In Vitro</i> , 25 J. Neurosci. Res. 463-75 (1990) |
| | BF | Drago, J., et al, <i>Fibroblast Growth Factor-Mediated Proliferation of Central Nervous System Precursors Depends on Endogenous Production of Insulin-like Growth Factor 1</i> , 88 Proc. Nat'l Acad. Scie. USA 2199-2203 (1991) |
| | BG | Kilpatrick, T.J., et al, <i>Cloning and Growth of Multipotential Neural Precursors: Requirements for Proliferation and Differentiation</i> , 10 Neuron 255-65 (1993) |
| | BH | Bannerman, P.G., et al, <i>Protein Growth Factor Requirements of Rat Neural Crest Cells</i> , 36 J. Neurosci. Res. 46-57 (1993) |
| | BI | Stemple, D.L., et al, <i>Isolation of a Stem Cell for Neurons and Glia from the Mammalian Neural Crest</i> , 71 Cell 973-85 (1992) |
| | BJ | Sommers, L. et al, <i>The Cellular Function of MASH1 in Autonomic Neurogenesis</i> , 15 Neuron 1245-58 (1995) |
| | BK | Lendahl, U., et al, <i>CNS Stem Cells Express a New Class of Intermediate Filament Protein</i> , 60 Cell 585-95 (1990) |
| | BL | Camu, W., et al, <i>Purification of Embryonic Rat Motoneurons by Panning on a Monoclonal Antibody to the Low-affinity NGF Receptor</i> , 14 J. Neurosci. Meth. 59-70 (1992) |
| | BM | Raff, M., <i>Glia Cell Diversification in the Rat Optic Nerve</i> , 243 Science 1450-55 (1989) |
| | BN | Lillien, L.E., et al, <i>Analysis of the Cell-Cell Interactions that Control Type-2 Astrocyte Development In Vitro</i> , 4 Neuron 525-34 (1990) |
| | BO | Vescovi, A.L., et al, <i>bFGF Regulates the Proliferative Fate of Unipotent (Neuronal) and Bipotent (Neuronal/Astroglial) EGF-Generated CNS Progenitor Cells</i> , 11 Neuron 951-66 (1993) |
| | BP | Temple, S., et al, <i>Isolated Rat Cortical Progenitor Cells are Maintained in Division In Vitro by Membrane-Associated Factors</i> , 120 Development 999-1008 (1994) |
| | BQ | Aloisi, F., et al, <i>Developmental Appearance, Antigenic Profile, and Proliferation of Glial Cells of the Human Embryonic Spinal Cord: An Immunocytochemical Study Using Dissociated Cultured Cells</i> , 5 Glia 181 (1992) |
| | BR | Cameron, R.S., et al, <i>Glia Cell Lineage in Cerebral Cortex: A Review and Synthesis</i> , 4 Glia 124-37 (1991) |
| | BS | Chan, C.L., et al, <i>Oligodendrocyte-type 2 astrocyte (O-2A) Progenitor Cells from Neonatal and Adult Rat Optic Nerve Differ in Their Responsiveness to Platelet-Derived Growth Factor</i> , 55 Brain Res. Dev. Brain Res. 273-82 (1990) |
| | BT | Elder, G.A., et al, <i>Characterization of Glial Subpopulations in Cultures of the Ovine Central Nervous System</i> , 1 Glia 317-27 (1988) |
| | BU | Fok-Seang, J., et al, <i>Distribution and Differentiation of AC35 - Glia, 2-precursors in the Developing Rat Spinal Cord</i> , 37 J. Neurosci. Res. 219-35 (1992) |
| | BV | Fulton, B.P., et al, <i>Visualization of O-2A Progenitor Cells in Developing an Adult Rat Optic Nerve by Quisqualate-Stimulated Cobalt Uptake</i> , 12 J. Neurosci. 4816-33 (1992) |

O 14 JCAB
FEB 21 2002
PATENT & TRADEMARK OFFICE

Sheet 03 of 03

| | | |
|---|--|---|
| | | Gallagher, D.S., et al, <i>Neurons and Glia Arise from a Common Progenitor in Chicken Optic Tectum: Demonstration with Two Viruses and Cell Type-Specific Antibodies</i> , 87 Proc. Nat'l Acad. Sci. USA 458-62 (1990) |
| BX | | Gard, A.L., et al, <i>Oligodendroblasts Distinguished from O-2A Glial Progenitors by Surface Phenotype (O4+GalC-) and Response to Cytokines Using Signal Transducer LIFR</i> 8. 167 Dev. Biol. 596-608 (1995) |
| BY | | Hardy, R., et al, <i>Proliferation and Differentiation Potential of Rat Forebrain Oligodendroglial Progenitors Both In Vitro and In Vivo</i> , 111 Development 1061-80 (1991) |
| BZ | | Hardy, R.J., et al, <i>Oligodendrocyte Progenitors Are Generated Throughout the Embryonic Mouse Brain, But Differentiate in Restricted Foci</i> , 122 Development 2059-69 (1996) |
| CA | | Knapp, P.E., <i>Studies of Glial Lineage and Proliferation In Vitro Using an Early Marker for Committed Oligodendrocytes</i> , 30 J. Neurosci. Res. 336-45 (1991) |
| CB | | Luskin, M.B., et al, <i>Neurons, Astrocytes, and Oligodendrocytes of the Rat Cerebral Cortex Originate from Separate Progenitor Cells: An Ultrastructural Analysis of Clonally Related Cells</i> , 13 J. Neurosci. 1730-50 (1993) |
| CC | | Miller, R.H., <i>Oligodendrocyte Origins</i> , 19 TINS 92-96 (1996) |
| CD | | Ono, K., et al, <i>Early Development and Dispersal of Oligodendrocyte Precursors in the Embryonic Chick Spinal Cord</i> , 121 Development 1743-54 (1995) |
| CE | | Raff, M.C., et al, <i>A Glial Progenitor Cell That Develops In Vitro into an Astrocyte or an Oligodendrocyte Depending on Culture Medium</i> , 303 Nature 390-96 (1983) |
| CF | | Rivkin, M.J., et al, <i>Oligodendroglial Development in Human Fetal Cerebrum</i> , 38 Ann. Neurol. 92-101 (1995) |
| CG | | Eisenbarth, G.S., et al, <i>Monoclonal Antibody to Plasma Membrane Antigen of Neurons</i> , 76 Proc. Nat'l Acad. Sci. USA 4913-17 (1979) |
| CH | | Geisert, E.E., et al, <i>The Neuronal Response to Injury As Visualized by Immunostaining of Class β-tubulin in the Rat</i> , 102 Neurosci. Lett. 137-41 (1989) |
| CI | | Sommer, I., et al, <i>Monoclonal Antibodies (O1-O4) to Oligodendrocyte Cell Surfaces: An Immunocytochemical Study in the Central Nervous System</i> , 83 Dev. Biol. 311-27 (1981) |
| CJ | | Trimmer, P.A., et al, <i>Combination of In Situ Hybridization and Immunocytochemistry to Detect Messenger RNAs in Identified CNS Neurons and Glia in Tissue Culture</i> , 39 J. Histochem. Cytochem. 891-8 (1991) |
| CK | | Wysocki, L.J., et al, <i>"Panning" for Lymphocytes: A Method for Cell Selection</i> , 75 Proc. Nat'l Acad. Sci. 2844-48 (1978) |
| CL | | Mayer, M., et al, <i>Ciliary Neurotrophic Factor and Leukemia Inhibitory Factor Promote the Generation, Maturation, and Survival of Oligodendrocytes</i> , 120 Development 142-53 (1994) |
| CM | | Bottenstein, J.E., et al, <i>Growth of Rat Neuroblastoma Cell Line in Serum-Free Supplemented Medium</i> , 76 Proc. Nat'l Acad. Sci. USA 514-17 (1979) |
| CN | | Lillien, L.E., et al, <i>Differentiation Signals in the CNS: Type-2 Astrocyte Development In Vitro as a Model System</i> , 5 Neuron 5896-6273 (1990) |
| EXAMINER | | DATE CONSIDERED |
| *EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. | | |